

# Your Guide to this Textbook

Each unit begins with a two-page set of questions: **Are You Ready?** These questions will help you assess which concepts you should review before you begin the unit.

## Unit 20 C Photosynthesis and Cellular Respiration

### ARE YOU READY?

These questions will help you find out what you already know, and what you need to review, before you continue with this unit.

You can review prerequisite concepts and skills on the Nelson Web site and in the Appendices. The **Appendices** are useful resources for your reference throughout the course.

Each chapter begins with **Starting Points** questions, helping you assess what you already know about the concepts for that chapter. Continue to consider these as you go through the chapter.

Throughout the chapters are activities that have one of the following icons on the left-hand side of their banner. Icons indicate the curriculum emphasis to which the activity relates.

Icon	Curriculum emphasis of activity
	Nature of Science
	Science and Technology
	Social and Environmental Contexts

**Investigations** are labs in which you will make predictions, form hypotheses, gather and record evidence, then analyze, evaluate, and communicate your results. **Report Checklists** in Investigations show you the parts of lab reports you will need to complete.

#### INVESTIGATION 6.1

##### Separating Plant Pigments from Leaves

Plants produce thousands of different chemical compounds,

Report Checklist		
<input checked="" type="radio"/> Purpose	<input type="radio"/> Design	<input checked="" type="radio"/> Analysis
<input checked="" type="radio"/> Problem	<input type="radio"/> Materials	<input checked="" type="radio"/> Evaluation
<input checked="" type="radio"/> Hypothesis	<input type="radio"/> Procedure	<input checked="" type="radio"/> Synthesis
<input checked="" type="radio"/> Prediction	<input type="radio"/> Evidence	

You will see an **Investigation Introduction** at the point in the chapter where you will most likely perform each Investigation.

#### INVESTIGATION 6.1 Introduction

##### Separating Plant Pigments from Leaves

Look at **Figure 5** with unaided eyes and determine its colour. Now look at the figure with a magnifying glass. What colours do you see? The spring and summer leaves of deciduous trees appear green in colour. Do green leaves contain only green pigments, or is there a mixture of pigments with the green

Report Checklist		
<input checked="" type="radio"/> Purpose	<input type="radio"/> Design	<input checked="" type="radio"/> Analysis
<input checked="" type="radio"/> Problem	<input type="radio"/> Materials	<input checked="" type="radio"/> Evaluation
<input checked="" type="radio"/> Hypothesis	<input type="radio"/> Procedure	<input checked="" type="radio"/> Synthesis
<input checked="" type="radio"/> Prediction	<input type="radio"/> Evidence	

A **Case Study** provides you with information or data, and then guides you in analyzing, decision making, or problem solving by a series of questions.

#### Case Study

##### Using Satellite and Airborne Technology to Monitor Photosynthesis and Productivity

Clear cutting has been practised for decades in Whitecourt, Alberta. Recently however, an increasing demand for wood has accelerated this cutting and placed added stress on the land base (**Figure 8**). In addition to harvesting for the forestry

In an **Explore an Issue** feature, you have the opportunity to define, research, analyze, and report on issues affecting our planet. The **Issue Checklist** shows you the parts of the decision-making process you will need to complete.

#### EXPLORE an issue

##### Harnessing Light Energy

By utilizing sunlight, plants produce food through What are the

Issue Checklist
<input checked="" type="radio"/> Issue
<input checked="" type="radio"/> Resolution
<input type="radio"/> Evidence
<input type="radio"/> Evaluation
<input type="radio"/> Analysis

**Sample Exercises** guide you step-by-step through a solution.

#### SAMPLE exercise 2

For the cross shown in **Figure 3**, what is the probability that an offspring will have a phenotype of wrinkled seeds? Express the answer as a percent.

**Solution**  
Since the allele for wrinkled seeds, *r*, is recessive, only offspring with a genotype *rr* will have wrinkled seeds. From the Punnett square, 1 of every 4 offspring are expected to have this genotype, so the probability that an offspring will have

You will have many opportunities throughout each unit for practice and review. **Practice** questions are found after all Sample Exercises and at other points throughout the chapter, and will help you to assess your understanding as you work.

#### Practice

1. A student working with *Drosophila* makes the following cross:  
 $E^1E^2$  (wild-type eye colour)  $\times E^2E^4$  (apricot eye colour)  
What will be the phenotypic ratio of the offspring?

You can review and demonstrate your understanding of the concepts and skills in each section using the **Summaries** and **Section Questions**.

The **Chapter Summary** lists the outcomes that you should have mastered as you worked through the chapter, as well as equations and key terms. There is also a box of questions—**Make a Summary**—to help you consolidate your understanding of the concepts addressed.

The **Chapter Reviews** and **Unit Reviews** give you practice in answering questions similar to those on the Alberta Diploma Exam. **Appendix A5** provides diploma exam tips and **Appendix D** contains numerical answers and short answers for questions throughout your textbook.

Other icons throughout the textbook will direct you to features to aid you in your learning.

Icon	Explanation	Icon	Explanation
	<ul style="list-style-type: none"><li>• an invitation to go to the <b>Nelson Web site</b> for research, additional information, or to reach an activity</li></ul>		<b>Caution</b> <ul style="list-style-type: none"><li>• a warning of particular safety concerns</li></ul>
	<b>Starting Points</b> <ul style="list-style-type: none"><li>• questions for you to check your knowledge of upcoming concepts, and to revisit at the end of the chapter to assess your learning</li></ul>		<b>Explorations and Mini Investigations</b> <ul style="list-style-type: none"><li>• brief activities that introduce new concepts or skills and help you to explore concepts being discussed</li></ul>
	<b>Lab Exercise</b> <ul style="list-style-type: none"><li>• data from an experiment for you to analyze and/or evaluate</li></ul>		<b>Extension</b> <ul style="list-style-type: none"><li>• reading material or an activity related to concepts or skills beyond the Alberta Biology 20-30 curriculum</li></ul>
	<b>Career Connection</b> <ul style="list-style-type: none"><li>• online information about a science-related career</li></ul>		<b>Chemistry Connection</b> <ul style="list-style-type: none"><li>• online information about a related topic in your chemistry course</li></ul>
	<b>Audio</b> <ul style="list-style-type: none"><li>• an audio file on the Student CD and the Nelson Web site that may be a walk-through of a Sample Exercise, an Extension, or pronunciation of Key Terms</li></ul>		<b>Web Activity</b> <ul style="list-style-type: none"><li>• activities on the Nelson Web site that are an integral part of your Biology textbook</li><li>– Web Quests (investigations in which you gather, analyze, and use online information);</li><li>– Case Studies (activities that provide information and then ask you to analyze it and draw conclusions);</li><li>– Simulations (interactive online activities or investigations); and</li><li>– Canadian Achievers (explorations of science-related careers of exceptional Canadians)</li></ul>
	<b>Video</b> <ul style="list-style-type: none"><li>• a video or animation on the Nelson Web site that demonstrates a technique or illustrates a concept</li></ul>		
	<b>Diploma Exam numerical response</b> style questions		
	<b>Diploma Exam written response</b> style questions		

## Preparation for Alberta Diploma Exams

We hope that your interest in science will grow and deepen as you work through your Biology course with the aid of this textbook. As your knowledge, skills, and attitudes develop, you will also be working toward the Biology Diploma Exam. This resource has been developed to help you achieve your best on the Alberta Biology 30 Diploma Exam. **Appendix A5** provides specific tips on writing the exam. Part 1 of the Chapter and Unit Reviews contain multiple choice and numerical response questions like you will find on the Diploma Exam. The numerical response questions are marked with this icon **NR**. Your teacher can provide you with additional questions we have provided to her/him. The Case Studies provide practice in answering closed-response written ques-

tions based on a scenario. In completing an Explore an Issue, you will develop skills for answering open-response written questions on the Diploma Exam. Here you will find and read information about a science-related issue and then formulate and communicate your ideas, supported by your research. You will apply these skills to the written-response (Part 2) questions in the Chapter Reviews and Unit Reviews, and in the **additional Diploma Exam-style Review Questions** on the Nelson Web site. These questions are longer scenario-based questions, sometimes using published articles. In the Chapter and Unit Review, this icon **DE** indicates a question that is in the format of a Diploma Exam written-response question.